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EXAMINER

TZENG, FRED

ART UNIT PAPER NUMBER

2651

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/914,170

Applicant(s)

KRISHNAMOORTHY ET AL.

Examiner

Fred Tzeng

Art Unit

2651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-10 is/are allowed.
- 6) ☒ Claim(s) 1-7, 11, 12 and 14 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to the amendment filed on July 28, 2004. Claims 2, 4, 7-10 have been amended with claims 11-14 added newly.

Response to Arguments

2. Applicant's arguments filed on July 24, 2004 have been fully considered but they are not persuasive.
3. In the remarks, applicants made two main points. The first argument being that, "There is no discussion of connecting and disconnecting the spindle motor 27 and the stepper motor 30 to the microprocessor 40 in a substantially out-of-phase synchronization during a power failure. Thus, the cited portions of Wevers do not teach or suggest connecting and disconnecting the first and second motors to the driving circuit in substantially out-of-phase synchronism". This argument is not persuasive. Wevers indeed teaches that the driving circuitry for second motor (the stepper motor 30), i.e., the normal stepper motor control circuitry 40, 42, 44 being disabled/disconnected during power failure (see column 3 lines 32-40), and the circuit 40 is the microprocessor 40. Also, the microprocessor 40 uses the back EMF from the still spinning spindle motor 27 to power the stepper retract circuits (see column 3 lines 45-53; i.e., the driving circuit 40 is connected to the spindle motor 27). The second argument being that, "While not identical in language or scope, independent claims 6 and 7 are not anticipated by Wevers because Wevers does not disclose "chopping" of a

connection to the spindle motor substantially synchronized out-of-phase with chopping of a connection to the positioning motor. Instead, as discussed above, Wevers simply disables the normal stepper motor control circuitry, 40-44, and leaves the spindle motor 27 connected to the spindle motor back EMF power source 54". This argument is not persuasive as disabling the circuitry 40-44 means chopping the connection to the positioning motor. Also, the back EMF from spinning spindle motor 27 is not connected when external power is on meaning that the connection to the spindle motor is chopped/disconnected when external power is on (see column 3 lines 32-53).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

RE claim 3, the limitation that "wherein the spindle motor and positioning motor are switched on and off from the driving circuit substantially in out-of-phase synchronism" is not clear and being indefinite, i.e., which one is switched on and which one is switched off is not clearly specified.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-7, 11, 12, 14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Wevers et al (USPN 4,679,102), hereafter as Wevers.

Regarding claims 1, 11 and 14, Wevers discloses a method for controlling a motorized mechanism in the event of external power loss (see column 1 lines 7-13), the motorized mechanism comprising first and second motors coupled to a common driving circuit (see column 3 lines 23-31 and figure 1A; i.e., the first spindle motor 27 and the second stepper motor 30 coupled to a common driving circuit microprocessor 40), the first motor being arranged to rotate at a substantially constant rate with external electrical power applied to the driving circuit (see column 3 lines 29-31 and figure 1A), wherein in the event of loss of the external electrical power to the driving circuit, the driving circuit is controlled so as to connect and disconnect the first and second motors to the driving circuit in substantially out-of-phase synchronism to enable the second motor to be driven with electrical power derived from back-emf of the rotating first motor (see column 1 lines 65-68, column 2 lines 1-26 and column 3 lines 10-53; i.e., the derived spindle motor back EMF power source 54 of the first spindle motor 27 is connected while the second normal stepper motor 30 control circuitry being disconnected to power the stepper retract circuit for driving or retracting the head 10 to the nondata area).

Regarding claims 2 and 12, Wevers discloses that the motorized mechanism comprises a driving mechanism for a data storage device (see column 3 lines 23-31 and figure 1A; i.e., the microprocessor 40 and circuitry 42, 44 and 46), wherein the first motor is a spindle motor and the second motor is a read/write head positioning motor (see column 3 lines 10-22 and figure 1A; i.e., the spindle motor 27 and the read/write head positioning stepper motor 30).

Regarding claim 3, Wevers discloses that in a disk drive having a spindle motor for rotating a data storage disk and a head positioning motor for positioning a read/write head (see column 3 lines 4-31; i.e., the spindle motor 27 for rotating discs 12 and stepper motor 30 for positioning read/write head 10), the spindle motor and positioning motor being coupled to be driven from an external power source by way of a driving circuit (see column 3 lines 23-31), a method for controlling the motors in the event of loss of the external power source during rotation of the spindle motor wherein the spindle motor and positioning motor are switched on and off from the driving circuit substantially in out-of-phase synchronism to enable the positioning motor to be driven with electrical power derived from back-emf of the rotating spindle motor (see column 1 lines 65-68, column 2 lines 1-26 and column 3 lines 10-53; i.e., the derived spindle motor back EMF power source 54 of the first spindle motor 27 is connected while the second normal stepper motor 30 control circuitry being disconnected to power the stepper retract circuit for driving or retracting the head 10 to the nondata area).

Regarding claim 4, Wevers discloses that the spindle motor is coupled to the upper and lower supply rails of the driving circuit by way of a plurality of respective

Art Unit: 2651

upper and lower semiconductor switching elements having parallel diode elements, and wherein switching on of the spindle motor corresponds to switching of the lower switching elements allows back-emf derived from the spindle motor to generate a recirculating current through the upper switching elements to the upper supply rail (see figure 2 and column 3 lines 48-68 and column 4 lines 1-5; i.e., the spindle motor is coupled to the upper supply rail 62 and lower supply rail 64 by way of a plurality of respective upper and lower semiconductor switching elements having parallel diode elements and wherein switching on of the spindle motor 27 corresponds to switching of the lower back-EMF winding 64 switching elements allows back-EMF derived from the spindle motor 27 to generate a rectified and filtered recirculating current through the upper switching elements to the upper supply rail 62).

Regarding claim 5, Wevers discloses that the positioning motor is coupled to the upper and lower supply rails of the driving circuit by pairs of upper and lower semiconductor switching elements, and wherein switching on of the positioning motor corresponds to switching on a selected one of the pairs of switching elements to connect the positioning motor to the upper and lower supply rails to drive the positioning motor with the recirculating current (see column 3 lines 59-68, column 4 lines 1-28 and figure 2 and the explanation rationale for claim 4).

Regarding claim 6, Wevers discloses a method for controlling a disk drive having a spindle motor and a positioning motor both coupled to a driving circuit (see column 3 lines 10-31), comprising the steps of: detecting a loss of supply power to the deriving circuit (see column 3 line 32); chopping connection between the spindle motor and the

driving circuit to generate an intermittent back-emf derived recirculating current (see column 3 lines 42-45); and chopping connection between the position motor and driving circuit at least substantially synchronized out-of-phase with the chopping of the spindle motor connection to enable driving of the positioning motor using the recirculating current (see column 3 lines 35-38, 42-53).

Regarding claim 7, Wevers discloses that a data storage device having a spindle motor for rotatably driving a spindle and/or disk (see column 3 lines 4-6), a positioning motor for positioning a read and/or write head (see column 3 lines 15-22), and a motor driving circuit coupled to controllably drive the spindle motor and positioning motor under normal operation using an external power supply (see column 3 lines 23-31 or figure 1A; i.e., items 40, 42, 44 and 46), the motor driving circuit including a controller (see figure 1A; i.e., the items 40, 46, 44 and 54) adapted to respond to loss of external power supply by chopping connection between the driving circuit and the spindle and positioning motors respectively in a substantially synchronized out-of-phase manner to enable driving of the positioning motor with a recirculation current derived from a back-emf of the spindle motor (see column 3 lines 23-53).

Allowable Subject Matter

8. Claims 8-10 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter: Claims 8-10 are allowable over the prior art of record because none of the prior art of record teaches or fairly suggests a disk drive comprising a driving circuit for

Art Unit: 2651

driving its spindle motor and stepper motor respectively, wherein the driving circuit including a storage capacitor for enabling transfer of BEMF energy from the spindle motor to the storage capacitor for powering VCM, and a voltage clamp for limiting the boosted storage capacitor voltage to protect other circuits from being damaged by a high voltage.

10. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Art Unit: 2651

13. Any inquiry concerning this communication from the examiner should be directed to Fred Tzeng whose telephone number is 571-272-7565. The examiner can normally be reached on weekdays from 9:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571-272-7843. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 571-273-7565 for After Final communications.

14. Informal regarding the status of an application may be obtained from the Patent Application Information Retrieval (**PAIR**) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Fred F. Tzeng



May 14, 2005



DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
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